This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.

If you have a suggestion to make the keys better, please fill out the short survey here.

Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.

---

1. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{5}{7} + \frac{4}{3}x \geq \frac{10}{8}x - \frac{9}{9}$$

The solution is $[-20.571, \infty)$, which is option B.

A. $(-\infty, a]$, where $a \in [-21, -20.25]$

$(-\infty, -20.571]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

B. $[a, \infty)$, where $a \in [-22.5, -17.25]$

* $[-20.571, \infty)$, which is the correct option.

C. $[a, \infty)$, where $a \in [18.75, 22.5]$

$[20.571, \infty)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a]$, where $a \in [18, 23.25]$

$(-\infty, 20.571]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

---

2. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

More than 9 units from the number 4.

The solution is $(-\infty, -5) \cup (13, \infty)$, which is option D.

A. $(-\infty, -5] \cup [13, \infty)$

This describes the values no less than 9 from 4

B. $(-5, 13)$

This describes the values less than 9 from 4

C. $[-5, 13]$

This describes the values no more than 9 from 4

D. $(-\infty, -5) \cup (13, \infty)$

This describes the values more than 9 from 4

E. None of the above

You likely thought the values in the interval were not correct.

General Comment: When thinking about this language, it helps to draw a number line and try points.

---

3. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$5 + 6x > 8x \text{ or } 8 + 4x < 5x$$

The solution is $(-\infty, 2.5)$ or $(8.0, \infty)$, which is option C.

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [-11.25, -7.5]$ and $b \in [-6.75, 0]$

Corresponds to inverting the inequality and negating the solution.

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-10.5, -3.75]$ and $b \in [-3.75, -0.75]$

Corresponds to including the endpoints AND negating.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-3.75, 4.5]$ and $b \in [5.25, 12.75]$

* Correct option.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [2.25, 4.5]$ and $b \in [3.75, 9.75]$

Corresponds to including the endpoints (when they should be excluded).

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

---

4. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-4 - 9x < \frac{-40x - 8}{6} \leq 5 - 7x$$

The solution is $(-1.14, 19.00]$, which is option A.

A. $(a, b]$, where $a \in [-3.97, -0.45]$ and $b \in [18, 20.25]$

* $(-1.14, 19.00]$, which is the correct option.

B. $(-\infty, a] \cup (b, \infty)$, where $a \in [-3.52, -0.82]$ and $b \in [16.5, 25.5]$

$(-\infty, -1.14] \cup (19.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

C. $[a, b)$, where $a \in [-3.45, 0.22]$ and $b \in [18, 21.75]$

$[-1.14, 19.00)$, which corresponds to flipping the inequality.

D. $(-\infty, a) \cup [b, \infty)$, where $a \in [-4.65, -1.05]$ and $b \in [16.5, 26.25]$

$(-\infty, -1.14) \cup [19.00, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

E. None of the above.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

---

5. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7x + 3 \leq 6x + 7$$

The solution is $[-0.308, \infty)$, which is option C.

A. $[a, \infty)$, where $a \in [0.05, 0.46]$

$[0.308, \infty)$, which corresponds to negating the endpoint of the solution.

B. $(-\infty, a]$, where $a \in [-0.48, -0.29]$

$(-\infty, -0.308]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

C. $[a, \infty)$, where $a \in [-0.55, -0.18]$

* $[-0.308, \infty)$, which is the correct option.

D. $(-\infty, a]$, where $a \in [-0.22, 0.9]$

$(-\infty, 0.308]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

---

6. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-3 + 9x > 10x \text{ or } 4 + 9x < 12x$$

The solution is $(-\infty, -3.0)$ or $(1.333, \infty)$, which is option B.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-5.25, -1.5]$ and $b \in [-0.75, 2.25]$

Corresponds to including the endpoints (when they should be excluded).

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-4.95, -1.95]$ and $b \in [0.75, 2.25]$

* Correct option.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-1.72, -0.22]$ and $b \in [1.5, 6.75]$

Corresponds to inverting the inequality and negating the solution.

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-1.5, 6]$ and $b \in [1.5, 12]$

Corresponds to including the endpoints AND negating.

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

---

7. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-8 + 8x \leq \frac{50x + 4}{6} < 6 + 6x$$

The solution is $[-26.00, 2.29)$, which is option B.

A. $(-\infty, a) \cup [b, \infty)$, where $a \in [-28.5, -22.5]$ and $b \in [0.75, 3.75]$

$(-\infty, -26.00) \cup [2.29, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

B. $[a, b)$, where $a \in [-32.25, -24]$ and $b \in [-1.5, 3]$

$[-26.00, 2.29)$, which is the correct option.

C. $(-\infty, a] \cup (b, \infty)$, where $a \in [-26.25, -24.75]$ and $b \in [-2.25, 3.75]$

$(-\infty, -26.00] \cup (2.29, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

D. $(a, b]$, where $a \in [-27, -22.5]$ and $b \in [-0.75, 6]$

$(-26.00, 2.29]$, which corresponds to flipping the inequality.

E. None of the above.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

---

8. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

Less than 4 units from the number 10.

The solution is $(6, 14)$, which is option A.

A. $(6, 14)$

This describes the values less than 4 from 10

B. $[6, 14]$

This describes the values no more than 4 from 10

C. $(-\infty, 6] \cup [14, \infty)$

This describes the values no less than 4 from 10

D. $(-\infty, 6) \cup (14, \infty)$

This describes the values more than 4 from 10

E. None of the above

You likely thought the values in the interval were not correct.

General Comment: When thinking about this language, it helps to draw a number line and try points.

---

9. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{6}{5} - \frac{7}{9}x < \frac{-5}{8}x + \frac{9}{3}$$

The solution is $(-11.782, \infty)$, which is option B.

A. (a, ∞), where $a \in [9.75, 15]$

$(11.782, \infty)$, which corresponds to negating the endpoint of the solution.

B. (a, ∞), where $a \in [-12, -8.25]$

* $(-11.782, \infty)$, which is the correct option.

C. $(-\infty, a)$, where $a \in [8.25, 13.5]$

$(-\infty, 11.782)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

D. $(-\infty, a)$, where $a \in [-13.5, -9.75]$

$(-\infty, -11.782)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

---

10. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-10x - 9 < -7x - 8$$

The solution is $(-0.333, \infty)$, which is option D.

A. (a, ∞), where $a \in [-0.17, 0.68]$

$(0.333, \infty)$, which corresponds to negating the endpoint of the solution.

B. $(-\infty, a)$, where $a \in [0.1, 1.4]$

$(-\infty, 0.333)$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

C. $(-\infty, a)$, where $a \in [-0.7, -0.2]$

$(-\infty, -0.333)$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

D. (a, ∞), where $a \in [-0.48, -0.25]$

* $(-0.333, \infty)$, which is the correct option.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.
